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# Teaching of Mathematics: Impact of Computer Assisted Instruction on 7<sup>th</sup> Grade Students

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**ABSTRACT:** Computers can be powerful support to mathematics teaching and learning because of drastic changes and advancement in technological landscape especially since 1990s. Classroom computer integration and the proliferation of Computer Assisted Instruction (CAI) programs in schools continue to advance. The integration of computer assisted instruction programs into school classrooms influences the role of the teacher and pupil-teacher relationships, placing a priority on the study of the CAI and its impact. The main objective this paper is to analyse the impact of CAI on 7<sup>th</sup> grade student's achievements and retention in mathematics. The paper falls under the category of quasi-experimental research. The data used therefore is mainly primary data. Secondary data has been used where required.

**KEYWORDS:** Computers, Mathematics, Learning, CAI, Impact, Achievements, Retention, Students.

## I. INTRODUCTION

Mathematics is the science of number and space. Mathematics is the science of measurement, quantity and magnitude. Mathematics is also called science of logical reasoning. Mathematics may also be defined as the science of abstract and imaginative form". Mathematics instruction is among the most explored research area in education. There have been considerably varied computer applications in instruction (Hatfield, 1984). One of the most important applications of computers in education is the CAI. Considering student teacher ratio and diverse group of students in a classroom it is very difficult for a teacher to reach to all the students. Hence there is a requirement of supplementary aids and methods along with normal classroom teaching. CAI plays very important role in this situation.

CAI means the use of a computer to provide the course content in the form of drill, practice, tutorial, and simulations. Demonstration, testing, information, and communication are the main facilities provided by CAI. As Heid (1997) asserts, "the single most important catalyst for today's mathematics education reform movement is the continuing exponential growth in personal access to powerful computing technology". The study examines the impact of CAI on mathematics achievements and retention of 7<sup>th</sup> grade students.

## II. DISCUSSION

The study was conducted in, "SMIE Institute of Education (Vessu) school in Anantnag District of J and K. All 7<sup>th</sup> grade students were the participants of this study throughout the Term I semester of the 2019-2020 academic year. There are three variables in this study. One of them is independent variable (Computer Assisted Instruction) and two of them are dependent variables (Mathematics Achievement and Retention). Based on pre-test results a group of students are formed for the experiment that serves as the experimental group and the matched pair of the students formed the comparison group, which serves as the control group. That is to say, each matched pair of student in each class (Group A and Group B) was assigned either to the experimental group (CAI) or to the control group (TI) according to their previous year mathematics grades, pre-test achievement scores and the experiences of the class teachers. The 7<sup>th</sup> grade mathematics achievement scores of the subjects were obtained from the grade report forms of the school records. The following table summarizes the distribution of students:



Table 1: Distribution of Students

Instruction	Group A	Group B	Total
Traditional Instruction(TI)	15	15	30
Computer Assisted Instruction (CAI)	13	13	26
N	28	28	56

After the unit was presented by class teachers, the experimental groups did the exercises with the CAI whereas control group with the text-book and/or teacher-made text materials. Experimental group was guided by the researcher twice a week however, the rest of the students which serves a control group was taught by the class teachers. At the beginning of each unit, a mathematics achievement test was given as a pre test (PT1, PT2, and PT3) and at the end of each unit; a mathematics achievement test was given as a post-test (PTM1, PTM2, and PTM3) to both the experimental and control groups. . Four months after the completion of the treatment, both groups were once more given the achievement tests (RT1, RT2, and RT3) in order to assess the retained mathematics achievement. The focus of this study was to find out the effects of computer assisted instruction on 7th grade students’ mathematics achievement in immediate and retained periods. Mathematics achievement was measured by the utilization of Mathematics Achievement Tests that were prepared by the researcher. The units “Integers”, “Fractions” and “Decimals” were included in this study.

III. RESULTS

Findings based on the PT1, PT2 and PT3, for the unit 2 and unit 3 respectively, indicated that there was no statistically significant difference between the mean scores of the students in the control and those in the experimental group. The results of the *t*-test are presented in Table 2.

Table 2. The results of pre achievement tests (PT1, PT2, and PT3)

Variables	Traditional Instruction		CAI		
	M	SD	M	SD	p
PT1	41.77	17.41	42.00	15.72	.63
PT2	34.43	19.26	34.64	19.65	.99
PT3	20.38	9.58	21.72	8.79	.98

Descriptive statistics in the pretests (PT1, PT2 and PT3), posttests (PTM1, PTM2 and PTM3) and retention tests (RT1, RT2 and RT3) carried on the units “Integers”, “Fractions” and “Decimals” showed that the experimental group that was exposed to CAI had a higher level of achievements compared to the control group that was treated with TI (Table 3).

Table.3

	INTEGERS						FRACTIONS						DECIMALS					
	PT1		PTM1		RT1		PT2		PTM2		RT2		PT3		PTM3		RT3	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
TI	41.77	17.41	60.46	22.42	57.23	22.85	34.43	19.25	60.00	19.49	56.54	21.90	20.39	9.58	45.77	19.63	28.85	16.76
CAI	42.00	15.72	72.69	16.35	68.97	18.04	34.66	19.64	77.41	14.80	67.76	19.22	21.72	8.79	60.00	20.83	35.45	20.30

#### IV. RESULTS

In the light of the findings obtained by the statistical analyses, the results could be summarized as follows:

- 1. The results of pre test and post test for unit 1: “Integers” revealed that the CAI applied to the experimental group was demonstrated to be effective in increasing the achievement scores of the students.
- 2. The results of inferential statistics demonstrated that there were significant differences between achievement tests’ mean scores of students in the experimental and control group on the second unit “Fractions” in the favor of computer-assisted instruction.
- 3. The results of pre test and post test for unit 3: “Decimals” revealed that the CAI applied to the experimental group was demonstrated to be effective in increasing the achievement scores of the students.
- 4. The students in the experimental group which exposed to CAI retained more of what they have learned on the unit 1 “Integers”.
- 5. The students in the experimental group which exposed to CAI retained more of what they have learned on the unit 2 “Fractions”.
- 6. On the contrary there was no significant difference between the experimental group exposed to CAI with *and* the control group exposed to traditional instruction on the retention test scores of the unit 3: “Decimals”.

#### V. CONCLUSION

As general phenomena in teaching methodologies in all academic disciplines, the teaching of mathematics also witnessed the more and more frequent use of computers. Meta-analyses, reviews of literature, and individual studies generally indicate that computer-assisted instruction has a positive effect on student learning. The results that were presented in the study showed that both the experimental group and the control group experienced improvement in mathematics achievement from the beginning of the intervention to the end of it. On the other hand, results indicated that students who were exposed to CAI significantly outperformed students who were exposed to TI on the mathematics achievement post tests of all the treatment units. In many of the studies computer had a significant positive effect on the achievement of the students’ mathematics test scores. This study offers promise and suggests that computer-assisted instruction would be good supplementary method of instruction for the conventional mathematics instruction in the mathematics courses.

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